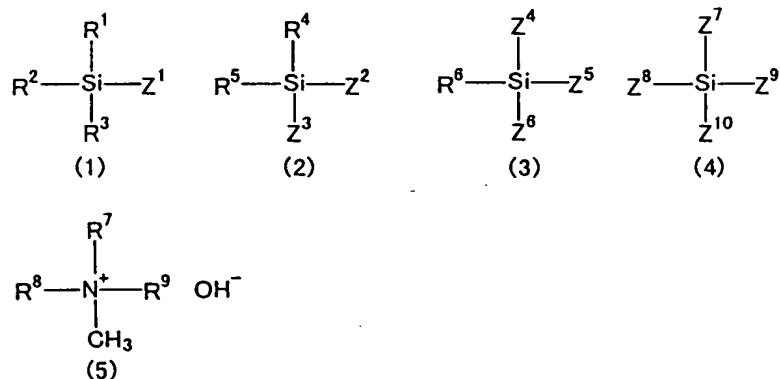


CLAIMS

1. A composition for forming a porous film comprising 10ppm or less halogen impurity and 100ppb or less metallic impurity where boron is counted in the metallic impurity, the composition being prepared by hydrolysis and condensation of alkoxy silane or a partial hydrolysis product of the alkoxy silane in an organic solvent in the presence of trialkylmethylammonium hydroxide as catalyst, wherein the alkoxy silane is one or more selected from the groups consisting of compounds represented by formulae (1) to (4) below, and the trialkylmethylammonium hydroxide is represented by formula (5) below,



wherein Z^1 , Z^2 , Z^3 , Z^4 , Z^5 , Z^6 , Z^7 , Z^8 , Z^9 and Z^{10} each independently represents an alkoxy group having 1 to 6 carbons; R^1 , R^2 , R^3 , R^4 , R^5 and R^6 each independently represents a monovalent hydrocarbon group which may or may not be substituted; and R^7 , R^8 and R^9 each independently

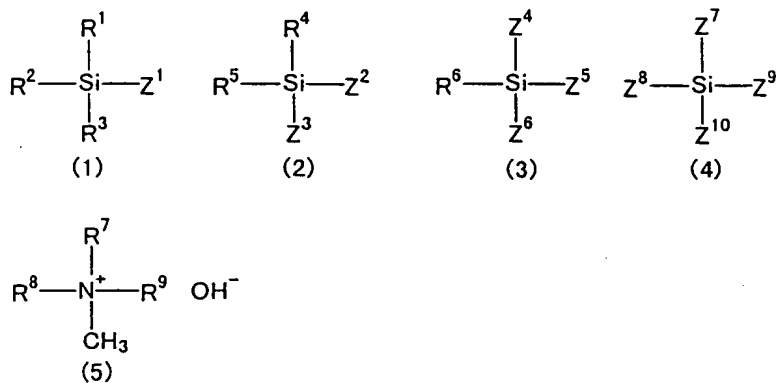
represents an alkyl group having 1 to 6 carbons.

2. The composition for forming a porous film according to Claim 1 wherein total carbon number of R^7 , R^8 and R^9 in said trialkylmethylammonium hydroxide is 4 to 15.

3. The composition for forming porous film according to Claim 1 or 2 wherein said trialkylmethylammonium has been formed with a reaction between trialkylamine and dimethyl carbonate.

4. The composition for forming a porous film according to any one of Claims 1 to 2, wherein said hydrolysis and condensation of alkoxysilane or the partial hydrolysis product of the alkoxysilane yields a product having a weight-average molecular weight of 10,000 to 1,000,000.

5. A method for manufacturing a composition for forming a porous film, comprising a step of hydrolysis and condensation of alkoxysilane or a partial hydrolysis product of the alkoxysilane in an organic solvent in the presence of trialkylmethylammonium hydroxide as catalyst, wherein the alkoxysilane is one or more selected from the group consisting of compounds represented by formulae (1) to (4) below, and the trialkylmethylammonium hydroxide is represented by formula (5) below which is a reaction product between trialkylamine and dimethyl carbonate,



wherein Z^1 , Z^2 , Z^3 , Z^4 , Z^5 , Z^6 , Z^7 , Z^8 , Z^9 and Z^{10} each independently represents an alkoxy group having 1 to 6 carbons; R^1 , R^2 , R^3 , R^4 , R^5 and R^6 each independently represents a monovalent hydrocarbon group which may or may not be substituted; and R^7 , R^8 and R^9 each independently represents an alkyl group having 1 to 6 carbons.

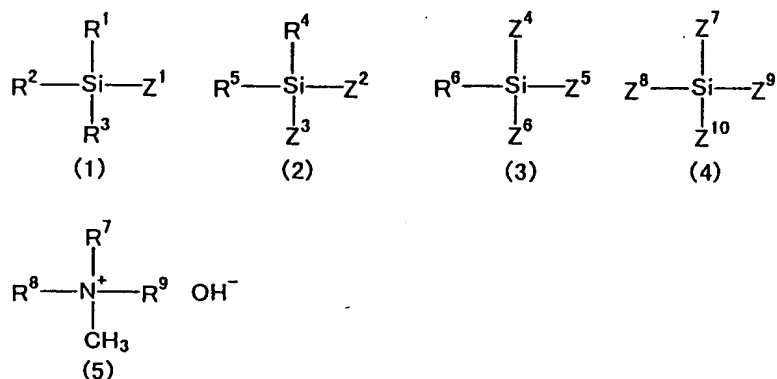
6. A method for manufacturing a porous film comprising steps of applying said composition according to any one of Claims 1 to 2 to a substrate so as to form a film thereon, drying the film and heating the dried film so as to produce a porous film.

7. A porous film formable by said composition according to any one of Claims 1 to 2.

8. An interlevel insulating film formed by said composition according to any one of Claims 1 to 2.

9. A semiconductor device comprising a porous film therein, the porous film being formable by a composition

comprising 10ppm or less halogen impurity and 100ppb or less metallic impurity where boron is counted in the metallic impurity, the composition being prepared by hydrolysis and condensation of alkoxysilane or a partial hydrolysis product of the alkoxysilane in an organic solvent in the presence of trialkylmethyllammonium hydroxide as catalyst, wherein the alkoxysilane is one or more selected from the group consisting of compounds represented by formulae (1) to (4) below, and the trialkylmethyllammonium hydroxide is represented by formula (5) below,



wherein $\text{Z}^1, \text{Z}^2, \text{Z}^3, \text{Z}^4, \text{Z}^5, \text{Z}^6, \text{Z}^7, \text{Z}^8, \text{Z}^9$ and Z^{10} each independently represents an alkoxy group having 1 to 6 carbons; $\text{R}^1, \text{R}^2, \text{R}^3, \text{R}^4, \text{R}^5$ and R^6 each independently represents a monovalent hydrocarbon group which may or may not be substituted; and R^7, R^8 and R^9 each independently represents an alkyl group having 1 to 6 carbons.

10. The semiconductor device according to Claim 9

wherein total carbon number of R⁷, R⁸ and R⁹ in said trialkylmethyammonium hydroxide is 4 to 15.

11. The semiconductor device according to Claim 9 or 10 wherein said trialkylmethyammonium hydroxide has been formed with a reaction between trialkylamine and dimethyl carbonate.

12. The semiconductor device according to any one of Claims 9 to 10 wherein said hydrolysis and condensation of alkoxysilane or the partial hydrolysis product of the alkoxysilane yields a product having a weight-average molecular weight of 10,000 to 1,000,000.

13. The semiconductor device according to any one of Claims 9 to 10 wherein said porous film is between metal interconnections in a same layer of multi-level interconnects, or is between upper and lower metal interconnection layers.